reported to have a poisonous effect upon the blood." His views on cures for snake-bite are those of a Rip Van Winkle; what we want is—

> "not so much a remedy which will absorb and neutralise the poison, as a means by which this neutraliser may be enabled to reach the poison, or a treatment for keeping up the vitality of a patient until the poison becomes absorbed by the system."

In short, he makes the words "absorbed" and "absorbent" as odious as the word "occupy" was to Doll Tearsheet.

In the chapter on "hunting" snakes, our author is as coherent and profound as honest Dogberry himself. The "necessary point" in this hunting to be borne in mind is that "it is less important to go where there are a great many snakes than to go where the nature of the country facilitates seeing and catching of them." So also, "a cobra is best obtained by digging one out of an ant-heap or hole," but "the cobra must have been seen to enter the hole a short time before," for all is vanity. As to smoking a snake out, "it takes a lot of smoke to have any effect on a snake, owing to the latter's lung capacity." The snake has only one lung, but that, like the one eye of Mr. Midshipman Easy's friend, the master's mate, is of prodigious power. When the author tried smoke "it was so suffocating and so blinding that the capture of the snakes was extremely difficult and somewhat risky"; little wonder that he regards it as "an unsatisfactory proceeding." The way to comprehend vagrom pythons "can only be learnt by practice"; but if the python be asleep "it can often be captured without any trouble."

Touchstone and his shepherd could not improve the chapter on snakes in captivity.

> "When feeding a tame python great care has to be exercised lest the snake should seize your hand in mistake for a rat, especially if your hand has just been in contact with the latter."

Truly it requires the careful experiments of a natural philosopher to discover

> "that cold is not so injurious to these reptiles as is commonly believed, but that it is the infrequency of the sun's rays that renders a climate such as that of England unsuitable for serpents."

Finally, we would commend this weighty precept:

> "Those who are desirous of keeping a serpentarium of live snakes should study as much as possible the conditions under which the various snakes live when in the wild state,"

otherwise they labour in vain on their "serpentarium."

THE METHODS OF ANTHROPOLOGY.

The Racial Anatomy of the Philippine Islanders. Introducing New Methods of Anthropology. By Prof. R. B. Bean. Pp. 236+25 photographs. (Philadelphia and London: J. B. Lippincott Company, 1910.)

THE most recent literature dealing with the study of man's physical characters reveals manifold signs of a widespread revolt against the domination of mere anthropometry in this field of research. It is often urged that no kind of investigation can claim the title "exact," or even be called "science," unless it deals with evidence that can be expressed in figures or mathematical symbols. But in all biological inquiries a primary sorting of the material is an indispensable preliminary to its mathematical treatment, and until the obviously heterogeneous elements in any series have been sifted, one species of material being separated from another, and males distinguished from females, any attempt to deal statistically with measurements of such unsorted material can produce only confusing and misleading conclusions.

The most urgent need in anthropology at the present time is the determination of those characters of the human body and its parts, which have definite significance as indications of race, and the investigation of the exact value and meaning of such traits, and of the bond of union between them and other distinctive characters, which are associated in groups in different individuals.

The comparative sterility of recent work in anthropology, so far as the determination of racial characters in series of skeletons is concerned, is due mainly to the common neglect of such preliminary studies and the immediate resort to blindly-made measurements as the sole means of investigation. It is the great merit of Sergi's work that he insisted on this return to the ordinary methods of zoological investigation in dealing with human remains, and by the use of such methods, crude and unsatisfactory as some of them undoubtedly are, he has been able to recover a great deal of true history of man's movements, and information concerning his affinities.

Prof. Bean's interesting book on the people of the Philippine Islands claims the consideration of the anthropologist, not so much for what he has accomplished, as from the fact that it is an attempt to direct the investigation of racial anatomy into its proper channel, for in it he has attempted to discriminate between the peculiarities of conformation of the external ear in the different racial elements in the Philippines, and use them as indices of race in precisely the same manner as the zoologist or "the man in the street" would distinguish a cat from a dog, even if these animals were of precisely the same size and quite irrespective of the measurements of their crania or other bones.

Dr. Bean has correlated the various types of ear with a large series of other physical characters, as well as with stature, proportion of limbs and trunk and head; and, like others who have undertaker similar investigations upon man or other living creatures, he finds that "the method of grouping reveals types that apparently represent *character-complexes* composed of unit characters," which "hang together in heredity or break up when crossed with other *character-complexes*."

Throughout the book the author is ever on the alert to detect Mendelian phenomena, and in chapter x. he builds up a scheme for the explanation of heredity in human mixtures.

The most unfortunate feature of Dr. Bean's sug-

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gestive essay is his application to the peoples of this far-eastern island of terms such as "Alpine," "Adriatic," "Iberian," "Cro-Magnon," and others, which are not without objections even when applied to the population of Europe, but become doubly misleading when applied to Filipinos, who are partially hybridised with real Iberians.

G. ELLIOT SMITH.

PROF. GROTH'S CHEMICAL CRYSTALLOGRAPHY.

Chemische Krystallographie. By P. Groth. Dritter Teil, Aliphatische und hydroaromatische Kohlenstoffverbindungen. Pp. iv+804. (Leipzig: W. Engelmann, 1910.)

DESPITE the duties appertaining to a professorial chair and the unremitting labour attaching to the editorship of his flourishing *Zeitschrift für Krystallographie und Mineralogie,* Prof. von Groth proceeds steadily and rapidly to the completion of the great task he has set before him. The successive volumes have appeared at intervals of two years, and now, four years since the publication of the first, we welcome the issue of the third and penultimate volume. It includes the various aliphatic and aromatic compounds that have been obtained in crystallised form, and meets a widely and long-felt want. Putting aside a few oxalates which occur in nature, it has hitherto been impossible to turn up readily the crystal character of any of these substances; even the most comprehensive text-books on organic chemistry rarely define the forms more exactly than as being plates or needles.

The volume is composed of two parts, of which the first is by far the longer. In it the paraffins and the corresponding olefines are grouped together according to the number of carbon atoms in the molecule, the concluding chapter being devoted to the ureas and the derivatives of uric acid. In the second part the hydrobenzol derivatives and the terpenes and camphors are considered. For each substance the physical characters are stated tersely, but as completely as possible, the information including the melting point, the specific gravity, the morphological characters—the axial ratios, the indices of the observed forms, the values of the principal interfacial angles, and the directions of cleavage, if any, illustrations of crystals possessing features of exceptional interest being given—and the optical characters—the principal refractive indices for light of various standard wavelengths, the nature of the refraction, the relation of the optical indicatrix to the crystalline symmetry, and the optic axial angle; the authority for the data is recorded, and references to the original papers are given in footnotes. Each section is prefaced by a brief but interesting discussion of the substances dealt with and the relations subsisting between them. The book closes with two complete indices; in one the substances are arranged alphabetically by their names, and in the other by their formulæ in ascending order of the number of carbon atoms in the molecule. Little difficulty should therefore be experienced in tracing any particular compound. It is abundantly clear that every effort has been made to keep the book as free from errors as possible; in a work of this kind accuracy is everything.

The name of the publisher is sufficient guarantee for the excellence of the printing, which is, in fact, beyond criticism.

APPLICATIONS OF PHYSICAL CHEMISTRY.

(1) *Themen der physikalischen Chemie.* By Prof. E. Baur. Pp. iv+113. (Leipzig: Akademische Verlagsgesellschaft, m.b.H., 1910.) Price 4 marks.

(2) *Das chemische Gleichgewicht auf Grand mechanischer Vorstellungen.* By Prof. H. v. Jüptner. Pp. v+367. (Leipzig and Berlin: B. G. Teubner, 1910.) Price 11 marks.

THE two volumes here noticed are not text-books of physical chemistry in the ordinary sense. They deal with selected parts of the subject, and are distinguished by the prominence given to its technical application.

Prof. Baur's book contains the substance of a series of vacation lectures delivered in the Brunswick Polytechnicum at the instance of the Society of German Engineers. The lectures are models of clear exposition, and are invariably terse and to the point. The experimental illustrations, directions for the repetition of which are included in the text, are well chosen, and calculated to stimulate inquiry. After a preliminary lecture on the principles of modern physical chemistry, the author proceeds to discuss such varied matters as voltaic cells, the blast-furnace, Deacon's process, the contact process for sulphuric acid, the production of atmospheric nitrate, catalysis, gas explosions, explosives in general, metallography, and colloidal chemistry. Students, both of industrial and of pure chemistry will find much to interest them in the little volume.

Prof. von Jüptner's work on chemical equilibrium is based on the following conceptions. The maximum external work which a chemical process is capable of performing is a measure of the chemical affinity of the process. This work can be measured by the gas pressures of the substances concerned. Hence chemical processes may be treated as mechanical, one substance being pumped into another (production of a compound) or being pumped out of another (decomposition of a compound). Thus dissociation phenomena may be considered as being at the root of all chemical processes. If the dissociation-pressure curves of all compounds are known, the behaviour of the compounds when they are brought together may be predicted; those with greater dissociation pressures will be decomposed, those with smaller dissociation pressures will be formed. The process will come to an end when the partial dissociation pressures of the common product (*e.g.* oxygen pressures of oxides) become equal.

Proceeding on these principles, the author considers the equilibrium conditions in systems with solid, liquid, and gaseous phases. As the book is intended in the first instance for practical men engaged in chemical industry, it is characterised by a wealth of

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